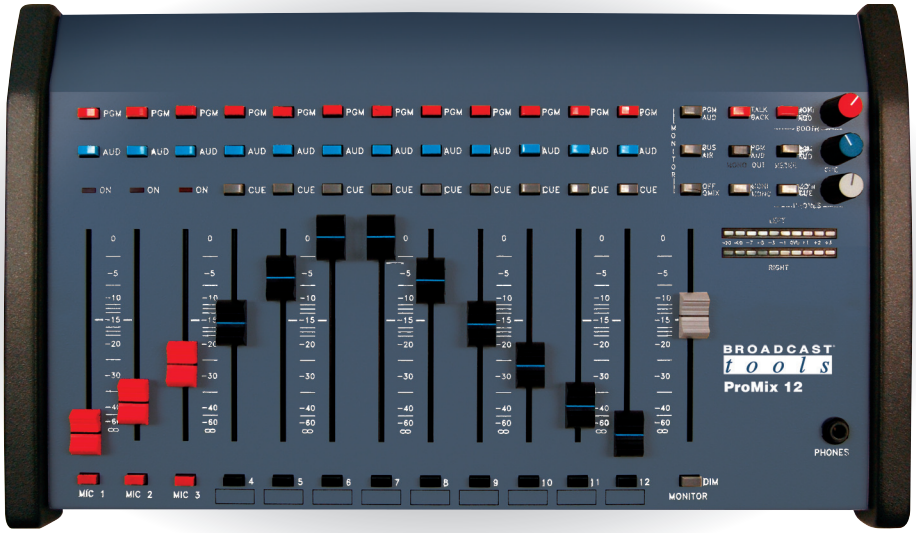
BROADCAST tools INC

Installation and Operation Manual



ProMix 12

Full-featured 12 Input Audio Mixing Console

Manual Update: 11/28/2006

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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® ProMix 12 Full-featured 12 input audio mixing console (referred to as the ProMix 12 throughout this manual). We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the Broadcast Tools® ProMix 12.

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WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

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NOTE:

This manual should be read thoroughly before installation and operation.

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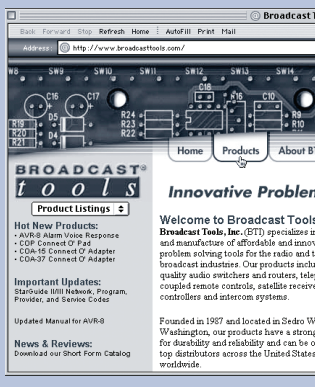

DESCRIPTION

The ProMix 12 is a full-featured audio mixing console ideally suited for the typical broadcast studio or any similar application. It features inputs for 3 microphones and 9 stereo line sources, two stereo mixing buses, a "mix-minus" output, a mono output, and comprehensive cue and monitoring systems. Other functions include an announce booth output with full duplex talkback, accurate audio level metering, remote control of mic channels and remote-start facilities on all line input channels

INSTALLATION

(See Figure 1 for connectors and controls (x) referenced in the text.)

AUDIO CONNECTIONS

MIC INPUTS

The ProMix 12 has inputs for up to 3 microphones. Microphones should be low-impedance professional units with balanced outputs. Dynamic microphones are suggested. Powered condenser microphones can be used, although the console does not provide phantom power. Connect microphones to the female XLR connectors (1) on the rear of the console. The mic plug should be wired as follows:

PIN 1: Ground
PIN 2: Hi
PIN 3: Lo.

MIC PROCESS INSERT

The ProMix 12 provides for the insertion of external microphone processing equipment, e.g, a mic limiter or equalizer. External mic procession equipment should be interfaced via the TRS Mic Process Insert jacks (2). These jacks provide a means of inserting processing gear just after the console's mic preamps, but before the mic channel faders. The mic preamp output and return circuits are unbalanced, at a nominal level of –10dbm. Wire the mating TRS plug as follows:

TIP:	To processor input (from mic preamp output)
RING:	From processor output (to console fader input)
SLEEVE:	Ground.

LINE INPUTS

The ProMix 12 accommodates up to 9 stereo "line level" sources. Source equipment can be either balanced or unbalanced, operating at either professional (+4dBm) or consumer (-10dBm) levels. It is connected via the Line Input TRS jacks (3). The upper jacks are for Left channel inputs; the lower jacks are for Right channel inputs. Mating TRS plugs should be wired as followed:

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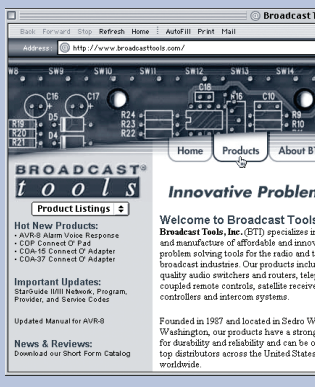

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Unbalanced sources:	TIP:	Hi (or "hot" lead)
	RING:	(leave unconnected)
	SLEEVE:	Ground (or shield)

Balanced sources:	TIP:	Hi
	RING:	Lo
	SLEEVE:	Ground

Note: The console terminates the Lo input to ground via a 1K resistor. In some cases, connecting the Lo audio lead to Ground will produce a slightly higher audio level. However, check the manual of the source equipment to be certain grounding the Lo output lead will not cause damage. It is generally OK to do so on older transformer-coupled outputs; active (transformerless) outputs may or may not permit this.

USING A TELEPHONE HYBRID

If the console will be interfaced to a telephone hybrid (for broadcasting telephone calls), the Receive ("caller") output of the hybrid should be fed into Channel 4. This is because the Mix Minus output of the console contains ALL line sources mixed to the Program bus, except for Channel 4. The" Program-minus-caller" Mix Minus output is normally fed back to the hybrid's send input. The caller will therefore be able to hear all program sources mixed on the Program bus, minus him.

AIR MONITOR INPUT

The console provides a Monitor Air input (4) that can be used to feed an off-air monitor into the console's Monitor system. This input is electrically identical to the other Line channel inputs, and should be connected the same way. Any tuner or demodulator can be used.

MAIN MIX BUS OUTPUTS

The console's six main mixing bus outputs appear on male XLR connectors (5). All outputs are electronically balanced; each will drive a 600-ohm load. The nominal level is +4dBm. Connect as follows:

PIN 1: Ground
PIN 2: Hi
PIN 3: Lo

Note: To feed an unbalanced load, connect to Pins 1 & 2 only. DO NOT SHORT PIN 3 TO GROUND. **It is not necessary to terminate any console outputs.**

MONITOR OUTPUT

The console's Monitor outputs (6) are via a TRS jack. These outputs are unbalanced, and will drive 600-ohm loads. (Termination is not necessary.) The nominal level is –10dBm. Connect the mating TRS plug as follows:

TIP:	Left Monitor output
RING:	Right Monitor output
SLEEVE	Ground

BOOTH OUTPUT

The console provides a secondary Booth monitor output (7) that can be used to drive headphones worn by an announcer in an "announce booth". This output, via TRS jack, will drive headphones of 300 ohms or higher. (Termination is not necessary.) The nominal output level is 0dBm. The mating TRS plus should be wired as follows:

TIP:	Left Booth output
RING:	Right Booth output
SLEEVE:	Ground

CUE/TALKBACK OUTPUTS

The console provides outputs to drive external amplified speakers for monitoring the Cue bus and Talkback circuit (8). Using the Cue output is optional, as the Cue bus can be monitored via the Monitor system (with the CueMix function) as well as via the Phones output. The Talkback output must be connected to an external (amplified) speaker if this feature is to be used. The Cue and Talkback outputs are unbalanced and will drive 600-ohm loads to a nominal level of –10dBm. (Termination is not necessary.) Inexpensive "computer speakers" are ideal for use with the Cue and Talkback outputs (audio quality unimportant). The mating TRS plug should be wired as follows:

TIP:	Cue output
RING:	Talkback output
SLEEVE:	Ground

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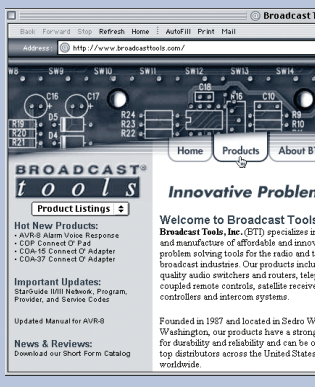

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CONTROL INTERFACE

MIC 2 & 3 REMOTE CONTROL

The console provides for remote control of Mic 2 and Mic 3 via the Mic 2 & 3 Remote Control connector (9).
This 15-pin D connector should be wired according to Figure 2.

Note that "cough switches" for Microphones 2 & 3 can be installed for use by the console operator if these microphones will be used in the studio. If these cough switches are not used, jumpers must be installed as shown between pins 9 & 10 and between pins 13 & 15. **Microphones 2 & 3 will not operate if these jumpers are missing.**

Cough switches can also be installed for remote use, as shown connected to the remote Microphone ON switches. If the "cough switches" are not used, jumper wires must be installed in their place.

LEDs can be used to show "Mic ON"; be sure to include the 1K resistor as shown. (This value can be changed to set LED brightness.)

The Talkback function allows the booth announcer to talk directly to the console operator (off-air) via the Talkback system.

The MUTE TALLY output on pin 4 provides a means of switching external equipment when the monitor mutes. This circuit goes to +12v (HI) when the monitor is muted. It can be used to operate "ON AIR" warning light controllers, etc.

LINE CHANNEL REMOTE CONTROL

The console provides 9 momentary SPST switches than can used for "remote start" of line channel source equipment, e.g, CD players, tape decks, etc. Interface to these switches is via Line Channel Remote Starts connector (10), a 25-pin D connector. WARNING: The maximum voltage that can be applied to Remote Start switches is 24vdc @ 100ma or less. DO NOT EXCEED THIS RATING. NEVER CONNECT THESE CIRCUITS TO A 110 VOLT AC LINE! Connect the mating 25-pin D connector according to Figure 3.

POWER INPUT

Plug the console's external power supply into the Power jack (11). Do not use any power supply not supplied with the console. The power supply is a "universal input" type, and can be used with any AC input voltage between 100 and 250 VAC, either 50Hz or 60Hz. No changes to the power supply are needed. The AC mains cord must have a connector appropriate for the AC socket being used.

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ADJUSTMENTS AND SETUP

MICROPHONE GAIN ADJUSTMENT

Each of the 3 Mic input channels has a GAIN adjustment (12) to optimize the mic preamp gain for the microphones being used. The gain can be varied over a 20dB range. Use a small screwdriver to adjust the gain trimmers as needed. Mic gain is properly adjusted when the preamp output (accessible via the TIP of the Mic Process Insert (2) TRS jacks) is about –10dBm when speaking into the microphone. To quickly set mic gain, follow these steps:

1. Assign the Mic channel to the Program bus.
2. Set the Mic channel fader to –15db.
3. Speak into the microphone; set gain so that voice peaks read a bout 0VU on the console VU meters.

MIC CHANNEL MONITOR MUTE PROGRAMMING

The console's Monitor system can be programmed so that when Mic 2 and/or Mic 3 are on, the audio output from the Monitor system is muted. If Mic 2 or Mic 3 is located in the same studio as the Monitor speakers, the Monitor system should mute to prevent acoustic feedback when the mic is on. Programming Mic 2 and/or Mic 3 to mute the Monitor system is done by installing jumper wires on the Mic 2 & 3 Remote Control connector (9). See Figure 2. To enable Mic 2 monitor mute, install a jumper between pins 3 & 11.

To enable Mic 3 monitor mute, install a jumper between pins 7 & 11.

TALKBACK MIC INPUT

The console includes a Talkback system that permits the console operator to speak to an announcer who is wearing headphones connected to the Booth output. When the TALKBACK button is pressed, the "normal" audio being fed to the Booth output is interrupted and is overridden by audio from the Talkback circuit. Because Mic 1 is normally used as the "console operator mic", Mic 1 is used to talk back to the Booth announcer. Another audio source can be substituted for Mic 1 (e.g, an intercom output) if necessary. See Figure 2 (Section 2.2.1). The jumper between pin 12 and pin 8 should be removed. External Talkback audio can be fed into pin 8. This input is unbalanced; the nominal input level should be about –10dBm.

LINE CHANNEL GAIN ADJUSTMENT

Each of the console's nine Line channel inputs has an Input Sensitivity switch (13) that must be set according to the source equipment being used with each Line channel input. These switches can be operated using the eraser-end of a pencil. There are two settings: OUT and IN. Set the switches OUT for professional levels, e.g, +4dBm or +8dBm; set switches IN for use with "consumer" equipment operating at about –10dBv. (The Line channel inputs are bridging and will not load source equipment.)

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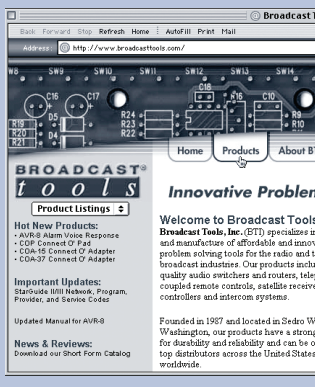

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OPERATION

(See Figure 4 for controls (x) referenced in the text.)

Operation of the ProMix 12 is simple and straightforward. Audio sources can be mixed to the Program and/or Audition buses. Line channels can be also be fed to the Cue bus. The console's outputs can be monitored via the Monitor system and VU meters. The console operator can also use headphones, plugged into the Phones output. A separate Booth output can feed headphones used by a booth announcer. The console operator can talk to the booth announcer using the Talkback function; the booth announcer can respond using the Talkback feature in the announce booth.

MIC INPUT CHANNELS

Mic channels are turned on and off using the Mic ON/OFF buttons (1). When a mic is on, the "ON" LED (4) will be illuminated. Mic audio can be assigned to the Program bus using the PGM button (2). The AUD button (3) assigns mic channel audio to the Audition bus. Both buses can be used simultaneously. The relative mix level is determined by the FADER (5). The "normal" position is –15dB, which yields 15dB of "in hand" gain.

Mic 1 is pre-programmed to mute the Monitor system when Mic 1 is on. Mics 2 and 3 can be user-programmed to mute the Monitor system if necessary. (See Section 3.2.)

LINE INPUT CHANNELS

Line channels are assigned to the Program and/or Audition bus using the PGM buttons (2) and AUD buttons (3). Both buses can be used simultaneously. Line channels can be "previewed" by using the Cue bus. Pressing the CUE button (7) will override other bus assignments, and send the audio to the Cue system (pre-fader). The relative mix level of line sources is determined by the FADER (6). The "normal" position is -15dB, which yields 15 dB of "in hand" gain. Line channel source equipment can be remotely started using the START button (8) directly below each line channel fader.

MONITOR SYSTEM

The console's main mix buses (PGM, AUD, and CUE) can be monitored via the Monitor system. In addition, audio from an off-air monitor can be heard through the Monitor system. A unique feature of the PROMIX 12is the "CueMix" system, whereby audio on the CUE bus can be heard through the Monitor system, providing the console operator Cue bus audio that is superior that coming from the traditional "cue speaker" found on most other consoles. Other Monitor functions include the ability to switch the Monitor output to monaural (to check for phase errors) and a DIM function that instantly lowers the Monitor output by 20dB.

Two buttons determine what is normally heard on the Monitor system. The

PGM/AUD button (9) selects either the Program or Audition bus. If the button is up, the Program bus is heard; if the button is down, the Audition bus is heard, provided that the BUS/AIR button (10) is up. If the BUS/AIR button (10) is down, the PGM/AUD selection is overridden, and the audio source fed into the Monitor Air input will be heard. This is normally fed with an off-air demodulator or tuner for monitoring the station's transmitted signal.

The Monitor system volume is adjusted using the Monitor FADER (11). The (external) monitor amplifier should be adjusted so that the Monitor system produces adequate volume with the Monitor fader set to about –15dB. The Monitor DIM button (13) attenuates the monitor volume by 20dB.

The MONI MONO button (14) combines the Monitor output to monaural. This is useful for checking mono compatibility of stereo signals. Note that this button affects only the monitor audio; it has no effect on the main mix bus outputs.

CUE SYSTEM AND "QUEMIX"

One unique feature of the ProMix 12 is the CueMix system. This allows the console operator to listen to audio signals on the CUE bus through the main monitor speakers, rather than the usual small ineffective "cue speaker" found on most broadcast consoles.

To use the CueMix feature (for example, to preview a track on a CD), follow these steps:

1. Put the CD player's line input channel in CUE mode by pressing it's CUE button (7).
2. Turn the CueMix feature ON, by pushing the QMIX button (12) down. The Monitor system will dim, reducing "normal" bus audio by 20dB; CUE bus audio will be heard through **the right monitor speaker.** Adjust Cue audio level using the CUE LEVEL control (24). Preview the source as needed.
3. Once the CD is "ready for air", release the QMIX button and the CUE button for the CD player channel. The Monitor system will return to normal operation.

The Cue system can also used in a "conventional" manner with the addition of an external (amplified) cue speaker, connected via the CUE/TB output jack. (See Section 2.9.) The audio level at this jack is controlled by the CUE LEVEL control (24). This Cue audio output mutes whenever the Monitor system is muted.
The cue bus can also be heard via the console operators PHONES output. (See Section 4.5)

PHONES OUTPUT

The console operator can monitor the console's Monitor output via the PHONES jack (15). Medium-impedance headphones of 32 ohms or higher can be used. Do not use older 8-ohm headphones. The MONI/CUE button (16) determines what is

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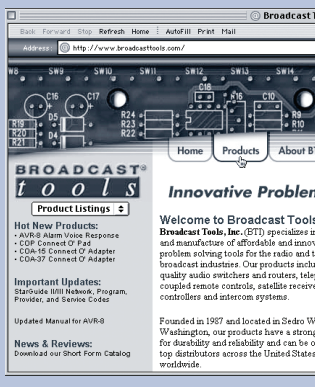

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heard through the headphones. If this button is up, the headphones will "follow" whatever audio source is selected for the Monitor system. If the button is down, the headphones will monitor the Cue bus. The headphone volume is adjusted with the PHONES control (17).

BOOTH OUTPUT

The console provides a secondary headphone output for use by an announcer in an "announce booth". The MONI/AUD button (18) determines what the booth announcer hears. If the button is up, the announcer will hear the same audio heard by the console operator via the Monitor system. If the MONI/AUD button (18) is down, the announcer will hear the Audition bus output. This allows the Audition bus to be used to create a special "announcer mix". The Booth headphone level is adjusted with the BOOTH control (19).

Use headphones with an impedance of 32 ohms or higher. Do not use older 8-ohm headphones.

TALKBACK SYSTEM

The console includes a full-duplex Talkback system that allows the console operator to converse with the booth announcer, off-air. (To use the system in duplex mode, an external amplified speaker must be connected to the TB OUTPUT as described in Section 2.9.) If the TALKBACK button (20) is pressed and held down, the "normal" audio feeding the Booth output is overridden with audio from Mic 1 (the console operator's mic). The booth announcer can respond by pressing the remote TALKBACK button (connected per Figure 2; see Section 2.2.1.) The console operator via the Talkback speaker will hear the announcer's mic. (One-way operation is possible without using the Talkback speaker. The console operator can still speak to the announcer, however the announcer cannot reply.)

MONO OUTPUT

The console includes a Mono output that provides a summed (L+R) signal of either the Program or Audition bus. The MONO OUT: PGM/AUD button (21) determines which bus is sent to the Mono output. If this button is up, the Program bus fed to the Mono output; if it is down, the Audition bus is fed to the Mono output. The Mono output is always at the same level at the Program and Audition bus outputs.

MIX-MINUS OUTPUT

The console's Mix-Minus output is a monaural mix of all sources assigned to the Program bus, except for Line channel #4. This input should be used for the "Receive" (caller) audio from a telephone hybrid. The Mix-Minus output is therefore the same as the Program mix, **minus the caller.** This Mix-Minus signal is normally fed back into the hybrid's "Send" input.

VU METERS

The ProMix 12 features accurate VU meters (23) to monitor the main bus output levels. Using the VU METER can meter either the Program or Audition bus: PGM/AUD button (22). If the button is up, the Program bus is metered; if it is down, the Audition bus is metered. Mix levels should be adjusted so most peaks read about 0VU. The meters are calibrated so that 0VU equals +4dBm on the main bus outputs.

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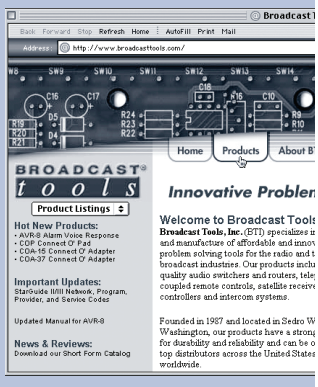

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SPECIFICATIONS

AUDIO INPUTS & OUTPUTS

MIC inputs:	-60dBm to –40dBm, 10K, balanced
MIC Process:	Post-preamp loop-thru: -10dBm, unbalanced
LINE inputs:	-10dBv or +4dBm, 10K, balanced or unbalanced
AIR input:	-10dBv or +4dBm, 10K, balanced or unbalanced
MAIN outputs:	+4dBm, balanced. 600 ohm load. Max output: +24dBm (6x)
MONITOR output:	-10dBm nom, unbalanced. 600 ohm load. Max output: +20dBm
BOOTH output:	-6dBm nom, unbalanced. 32 ohm load. Max output: +20dBm
PHONES output:	-6dBm nom, unbalanced. 32 ohm load. Max output: +20dBm
CUE/TB outputs:	-10dBm, unbalanced. 5K load. Max output: +10dBm

AUDIO PERFORMANCE

Frequency response:	20Hz-15kHz, +/- 0.5dB
Mic channel EIN:	-125dBm; 75dB S/N with 50dB preamp gain typical
Output noise:	75dB below nom output level, 1 Mic channel on. 80dB below nom output level, 1 Line channel on.
Distortion:	.02% THD, IM at nom output level; .01% at max level
Input headroom:	30dB (pre fader)
Output headroom:	20dB (post fader)
Crosstalk:	65dB @ 1kHz

POWER REQUIREMENTS

AC input:	100 to 250 VAC, 11 watts.
Power supply:	Supplied switching supply
Ground:	Chassis grounded to mains ground via power supply cable
Approvals:	UL1950, CSA950,TUV/IEC950

PHYSICAL

Size:	18”W x 10.5”D x 4”H
Weight:	10 lbs
Options:	Rack mount adaptors.

*Specifications subject to change without notice.

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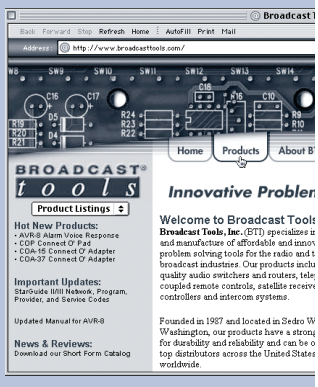

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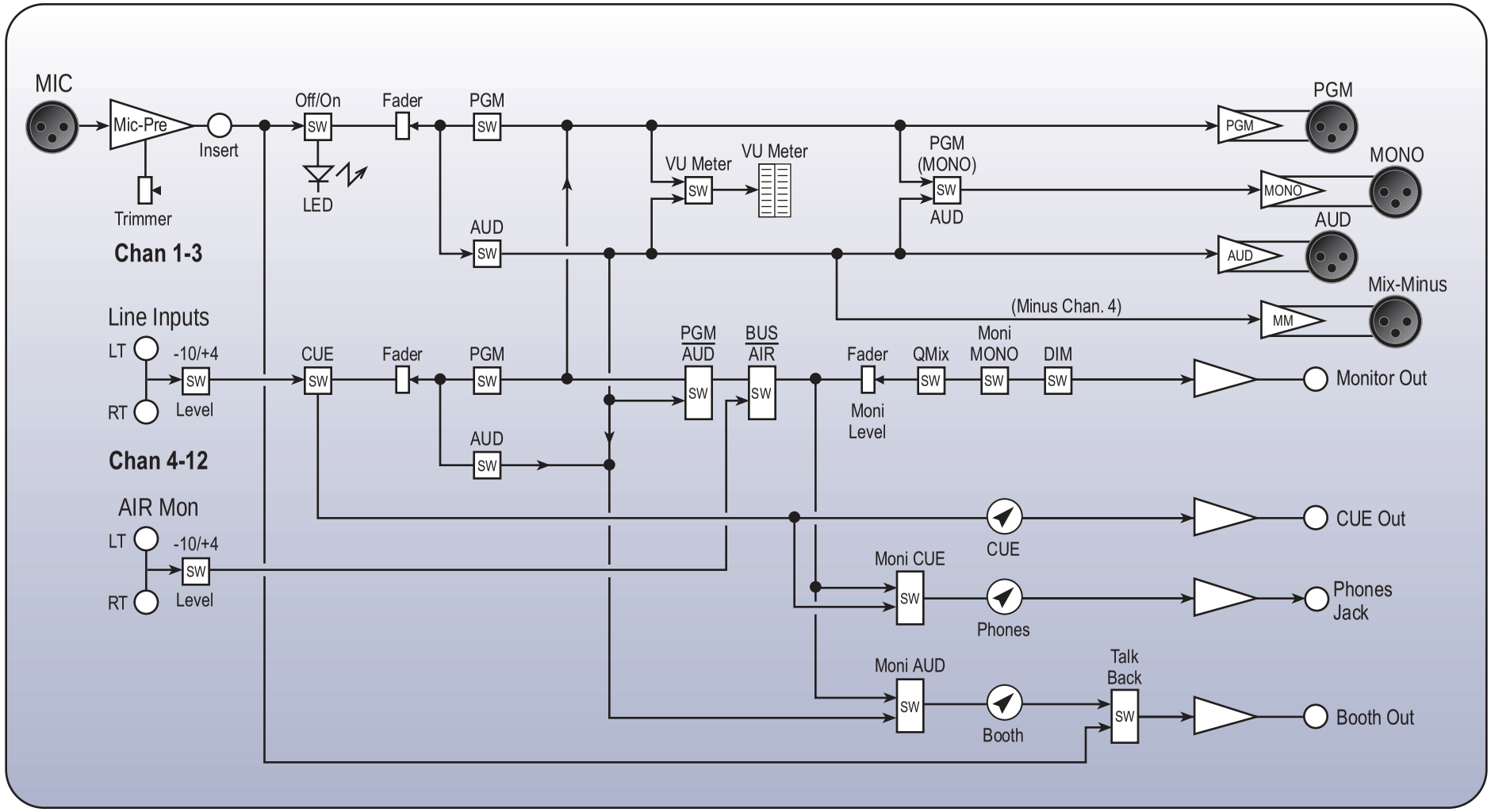
ProMix 12

Full-Featured 12 Input Audio Mixing Console

Functional Diagram



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Date Modified: 05/16/07 Rev A & B

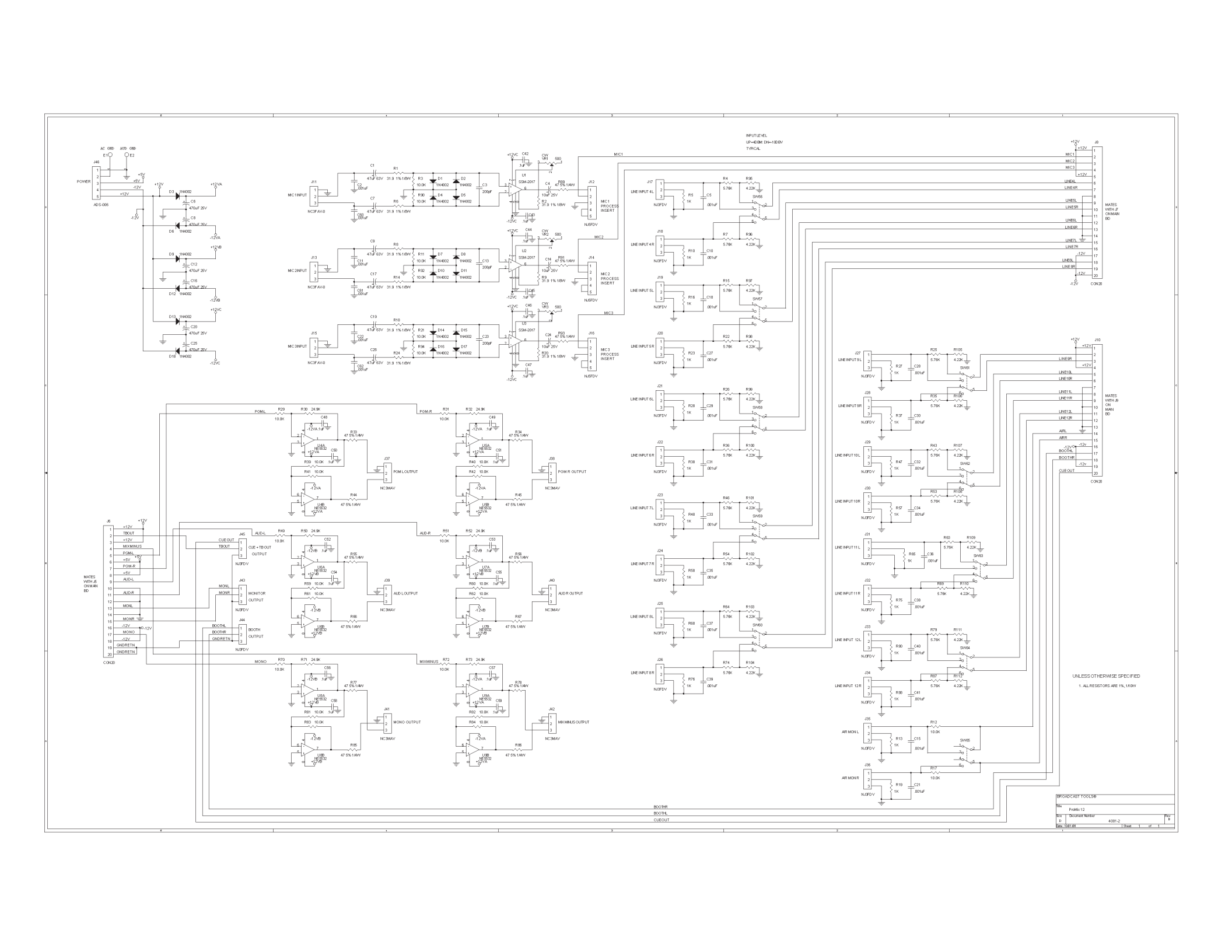

INPUT LEVEL
UP=+8DBM, DN=-10DBV
TYPICAL
MIC1
MIC2
MIC3
MIC 1 INPUT
MIC 2INPUT
MIC 3INPUT
MIC 1 PROCESS INSERT
MIC 2 PROCESS INSERT
MIC 3 PROCESS INSERT
LINE INPUT 4L
LINE INPUT 4R
LINE INPUT 5L
LINE INPUT 5R
LINE INPUT 6L
LINE INPUT 6R
LINE INPUT 7L
LINE INPUT 7R
LINE INPUT 8L
LINE INPUT 8R
LINE INPUT 9 L
LINE INPUT 9R
LINE INPUT 10L
LINE INPUT 10R
LINE INPUT 11 L
LINE INPUT 11R
LINE INPUT 12L
LINE INPUT 12 R
AIR MON L
AIR MON R
PGM-L
PGM-R
AUD-L
AUD-R
MONO
MIXMINUS
PGM L OUTPUT
PGM R OUTPUT
AUD L OUTPUT
AUD R OUTPUT
MONO OUTPUT
MIX MINUS OUTPUT
CUE + TB OUT OUTPUT
MONITOR OUTPUT
BOOTH OUTPUT
MATES WITH J8 ON MAIN BD
MATES WITH J7 ON MAIN BD
MATES WITH J6 ON MAIN BD
CON20
POWER
ADS-006
BOOTHL
BOOTHR
CUEOUT
UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 1%, 1/8 W
BROADCAST TOOLS®
ProMic 12
4001-2

FIGURE 2
MIC 2 & 3 REMOTE CONTROL

15-PIN DB15 CONNECTOR

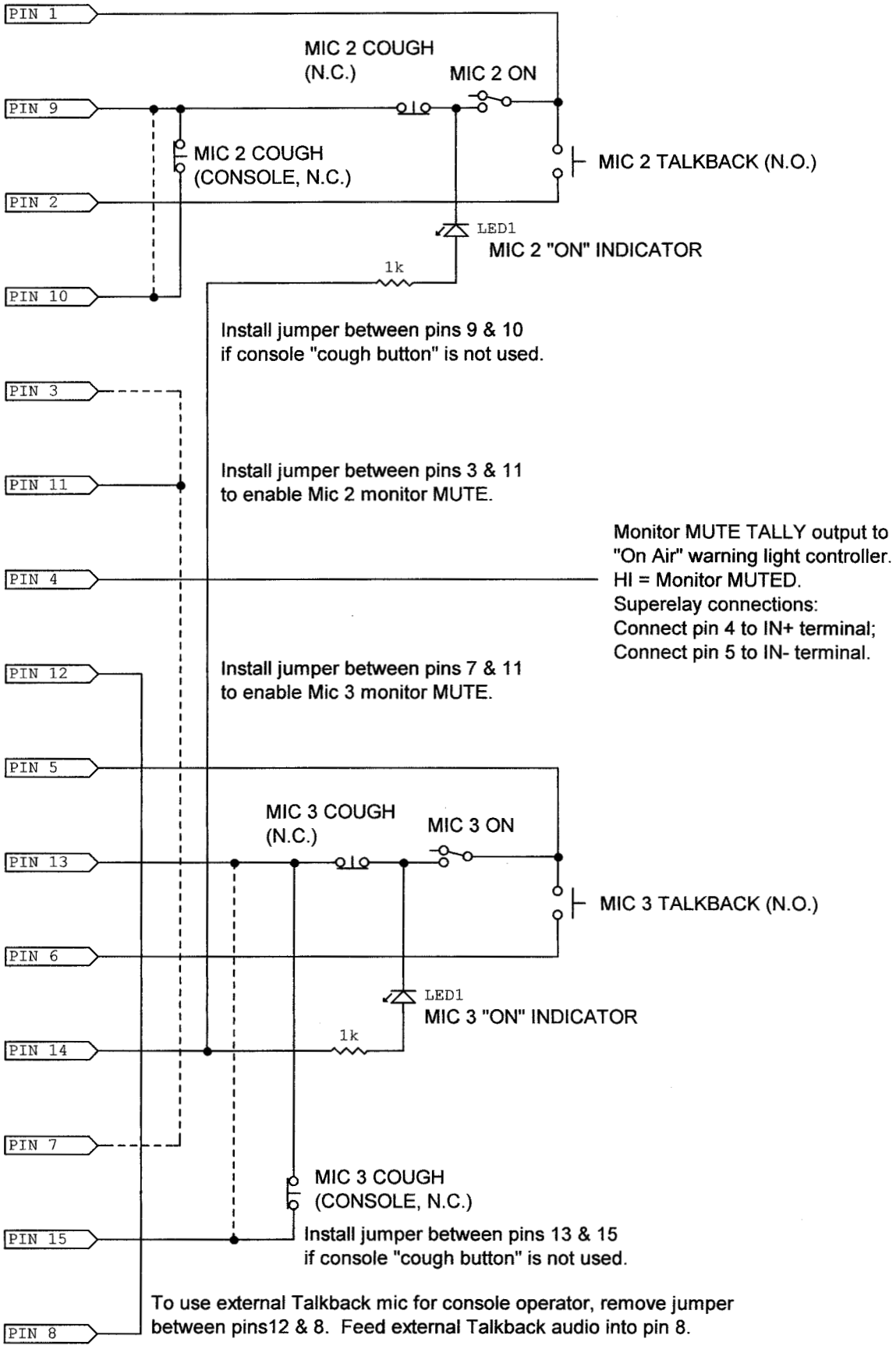
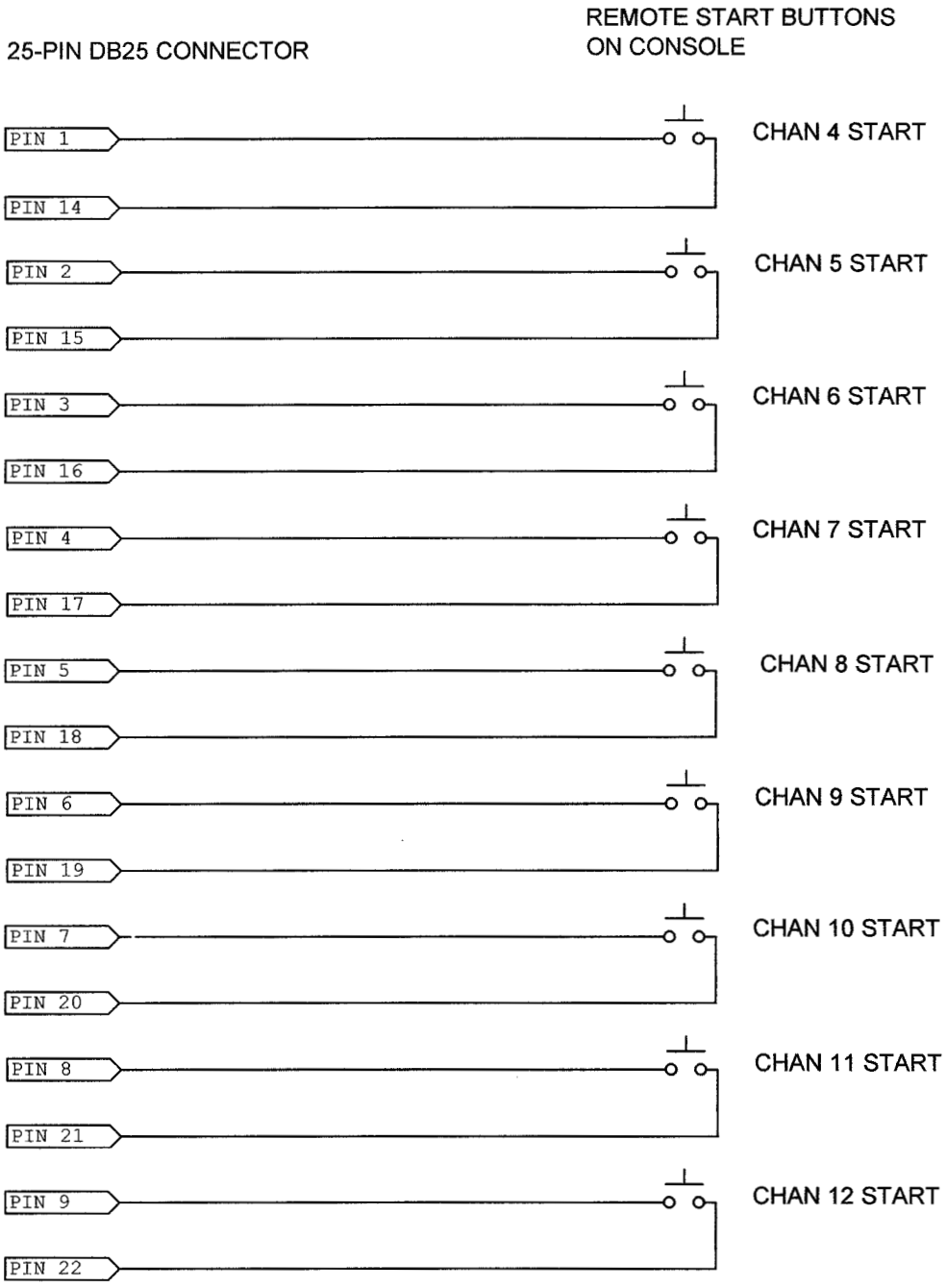
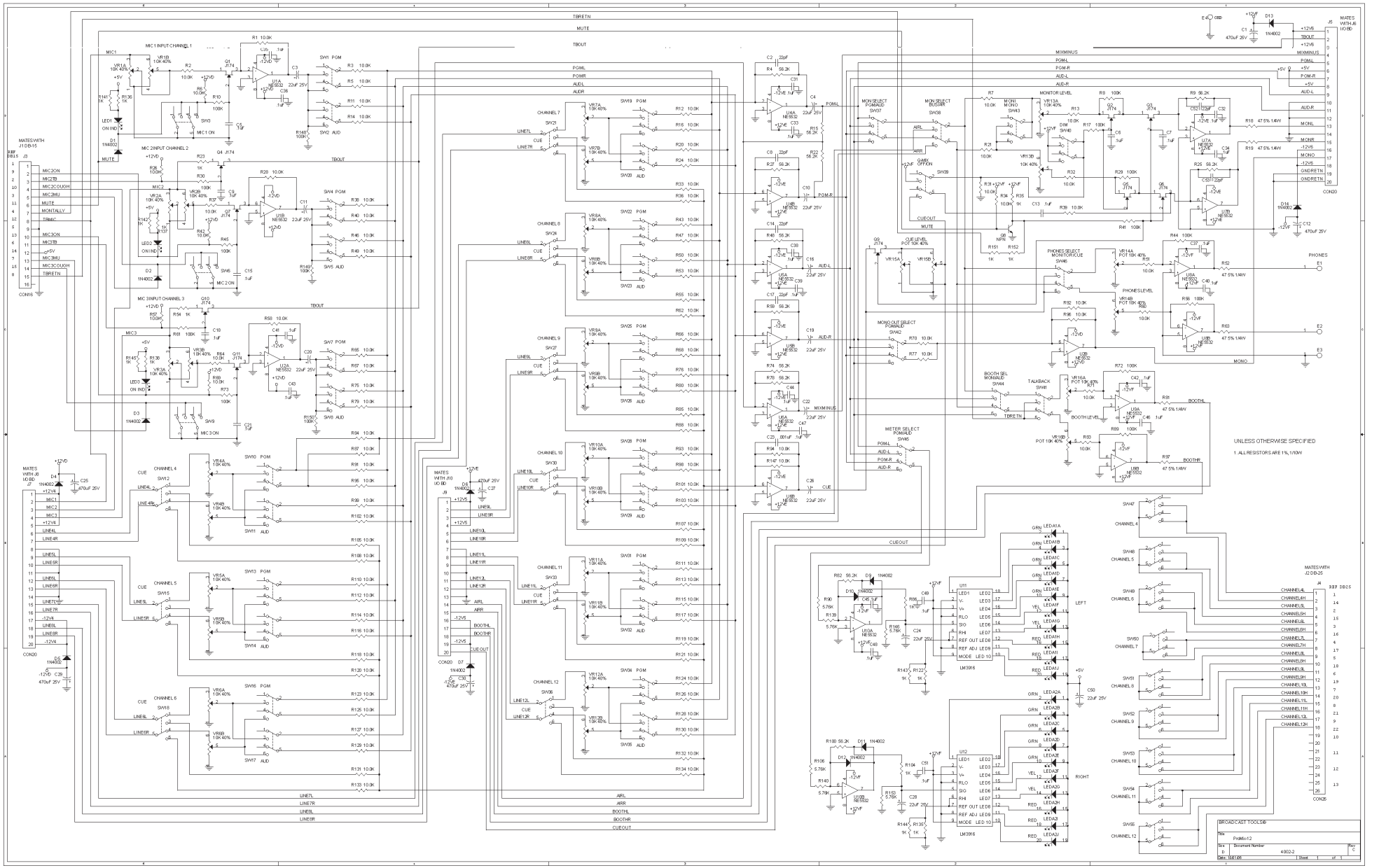


FIGURE 3
"REMOTE START" CONNECTIONS




TBRETN
MUTE
TBOUT
MIC 1 INPUT CHANNEL 1
MIC 2 INPUT CHANNEL 2
MIC 3 INPUT CHANNEL 3
MATES WITH J1 DB-15
MIC1ON
MIC2TB
MIC2COUGH
MIC2MU
MUTE
MONTALLY
TRMIC
MIC3ON
MIC3TB
MIC3MU
MIC3COUGH
TBRETN
CON16
MIC1 ON
MIC2 ON
MIC 3 ON
PGMR
PGML
AUDL
AUDR
CHANNEL 7
CHANNEL 8
CHANNEL 9
CHANNEL 10
CHANNEL 11
CHANNEL 12
MATES WITH J10 BD
CON20
AIRL
AIRR
BOOTHL
BOOTHR
CUEOUT
MIXMINUS
MON SELECT PGMAUD SW37
MON SELECT BUSSW SW38
MONO MONO SW43
MONITOR LEVEL
DIM SW40
MONL
MONR
MONO
PHONES SELECT MONITOR/CUE SW46
CUE LEVEL POT 10K 40%
PHONES
PHONES LEVEL
MONO OUT SELECT PGMAUD SW42
BOOTH SEL MONAUD SW44
TALKBACK SW48
BOOTH LEVEL
METER SELECT PGMAUD SW45
LEFT
RIGHT
LM3916
MATES WITH J2 DB-25
DEF DB25
CON25
UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE 1%, 1/10W
BROADCAST TOOLS®
ProMix-12
4002-2